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This article will analyze the main environmental challenges facing Taiwan by trying to answer a series of fundamental questions: What are the country's main environmental problems and what are the causes of these issues? How is Taiwan tackling such problems, both politically and as a society? Who are the primary stakeholders in solving Taiwan's current environmental challenges? And, what are the barriers to implementing effective environmental policy? To address these questions the article will delve into one recent successful case study, where environmental activists managed to stop the construction of a polluting facility.

Environmental problems facing Taiwan

Prior to lifting martial law in 1987, Taiwan experienced three decades of rapid industrialization with little or no concern for the environment, and brought forth several problems, which have deteriorated both the quality of life and of the environment. In the past twenty years, Taiwan has seen a surge in environmental organizations, which to a certain degree have enjoyed a remarkable success in fighting polluting industries or affecting environmental policies. While the situation has improved greatly since the 1990s, several issues remain unsolved. Some of these are global concerns, such as acid rain or an increase of greenhouse gases and watercourses pollution, while others pertain to the local problems particular to Taiwan and are shaped by both its developmental choices as well as by its geographical and natural characteristics.

First, Taiwan has seen an increase in waste production since its rapid economic growth and urbanization processes started. Such wastes, which end up polluting soil, water bodies and the atmosphere, carry varying degrees of threat to human health.[1] Human impact on the natural environment—brought forth by rapid population growth and urbanization—is also visible through damaging flora and fauna as well as on cultivated land, which keeps shrinking. In many coastal areas, often among the most fertile, salinization of groundwater and land subsidence poses a threat to farmers and residents livelihood.[2] Among the most visible effects of a human footprint is the massive reduction of Taiwan's natural forest cover, which currently stands at less than 50 percent of the island's total surface.[3] Penetration of remote mountainous areas by road and railway construction is another issue created by human impact. It is a typical (but always unnatural) sight to see hordes of motorcycles in previously pristine places such as Green Island

or atop the country's highest peaks. Last but not least, one of the biggest environmental challenges currently facing Taiwan are the damages to soil, land, water and air created by several types of "dirty industries," such as the semiconductor or the petrochemical sectors, which have selected the country as their "safe haven," making Taiwan among the world's leaders in these industries. In the absence of a public national system for industrial disposal, these industries have disposed solid and liquid wastes with impunity.[4] Government-owned industries, such as the petrochemical and steel industries around the harbor city of Kaohsiung, have also been among the worst offenders.[5]

Actors and stakeholders involved

In the early days Taiwan's environmentalism was comprised of different actors: from middle class intellectuals and scholars educated abroad—aware of the need to protect the environment and in tune with the international environmental community and discourses—to victims of pollution, whose scope and interests rarely extended beyond their immediate surroundings.[6] These two groups sometimes collaborated and at other times opposed one another. Frictions were particularly severe when monetary compensation for pollution, viewed by middle-class intellectuals as a "selling-out" of the environment, was involved. While such tensions were extremely high in the 1980s and 1990s, with mutual incomprehension fostering suspicion and pitching one group against the other, the situation has gradually improved.[7] There is currently abundant cooperation among the different groups comprising the environmental movement, facilitating a positive outcome for protesters in many developmental controversies.

At the political level, the party in Taiwan that married the environmental cause is the Democratic Progressive Party (DPP), which was established in 1987. At the onset, the party chose environmental protection as one of its main tenets and political platforms and was thus able to win sympathies among environmental activists, who became supporters of the party; these two groups came together in light of their common opposition to the KMT one-party rule. As noted by Shih Fang-long of the London School of Economics, "[...] in the case of Taiwan, environmental movements addressed not only specific environmentalist issues, but were also more generally a part, though not necessarily consciously so, of the wider struggle for the democratisation of Taiwan."[8] In this optic, the rise of social movements has been crucial for the journey towards democratization.

However, when the DPP was first elected at the national level and a DPP president, Chen Shui-Bian, ruled over Taiwan, many of its previous pro-environmental pledges quickly came to be forgotten in the midst of more pressing concerns, such as creating jobs and further developing the economy.[9]

Furthermore, a plethora of new actors, from the activist lawyers to the members of a more radical anti-globalization fringe, such as the grassroots organization *Taiwan Rural Front*, have recently joined the ranks of Taiwan's environmentalists. Unlike early "elitist" environmental activists, more

preoccupied with providing rich urbanites an improved environment rather than dealing with the plights of the rural population, a new generation of green activists began to target rural villagers as main recipients of their aid efforts. In certain rural areas where local residents are less informed than their urban counterparts, middle-class professionals and social activists are increasingly working with villagers to educate them and provide legal aid and assistance. Making environmental concerns “trans-local” by establishing broader coalitions has been able to garner nationwide attention and rendered the environmental movement less partisan and more autonomous. Additionally, these new strategies have established the conditions for increasing national support towards environmental campaigns. Particularly significant is recruiting skilled experts to help activists, such as lawyers who help with rules and regulations, and medical experts and epidemiologists who have released several studies on past and forecasted effects of pollution on human health.

Case study: Kuokang petrochemical technology

The petrochemical industry in particular is increasingly covered by environmentally-friendly media outlets, which give high visibility to accounts of explosions releasing toxic gases (as was the case in 2010 in Yunlin, site of Taiwan’s sixth naphtha cracker) and increasing cancer rates in nearby areas.[10] Yunlin is also the subject of several studies by toxicology experts at Taiwan’s main universities, who are trying to establish a link between the levels of pollution and the incidence of cancer and other illnesses.[11] Since the petrochemical industry constantly upgrades its capacity and is geographically spread out over the island, environmental and related health issues are distributed around Taiwan’s territory.[12]

In recent years, opponents of the petrochemical industry have scored groundbreaking victories for the environmental movement. Between 2008 and 2011 environmentalists successfully opposed and stopped the construction of Taiwan’s controversial eighth naphtha-cracker [13] or Kuokuang Petrochemical Technology Co. (國光石化科技, *guoguang shihua keji*), KPT, in central Taiwan. The 2,773-hectare complex was set to be the second biggest on the island after Formosa Plastic Group’s (台塑集團, *taisu jituan*) refinery complex, Mailiao (the already mentioned sixth cracker in nearby Yunlin County). The proposed location of the Kuokuang’s cracker was the 4000-hectare stretch of wetland at the estuary of the Jhuoshuei River (濁水溪, *zhuoshui xi*),[14] which also forms part of the habitat for several wild bird species and the white dolphin, whose population is believed to number fewer than 100 specimen nowadays.[15] The involvement of well-known people from the artistic and cultural community and their high status in society gave a boost to the anti-Kuokuang movement. Film directors, teachers and poets joined the more traditional stakeholders (e.g. activists, journalists, politicians, local residents, scholars) and symbolized, in my opinion, one of the most interesting new additions to the environmental governance process of the country. Other heavily involved groups and individuals in the anti-Kuokuang movement were local farmers and oyster fishermen who worked together with students, medical experts, lawyers and religious groups from all over Taiwan.

Several national NGOs supported local activists in their fight by focusing on several fronts of the proposed project: its impact on the environment, the local economy (e.g., oyster farmers) and residents' health, and whether the petrochemical industry is positive or not for Taiwan's future development. Environmental lawyers assisted protesters by offering their services pro-bono.[16] Thanks to the weight of such concerted efforts, by the summer of 2010 several important media outlets ran stories on the anti-Kuokuang movement, which in turn informed the general public about the issue and generated widespread interest and sympathy for the movement.

An interesting aspect of this specific protest campaign lays in the utilization of legal tools and regulations. These tools were made available thanks to the introduction of participatory channels imported from other democratic systems,[17] which activists employed in order to push forward their agenda. Local villagers and residents believed that pollution from the complex would have harmed their health and the ecosystem, but they also understood that to stop the complex they needed to do more. Based on this understanding, instead of framing their protest in environmental terms, they shifted their strategy and framed their claims mostly in terms of "violation of land-related regulations". This piggybacking on land issues proved a successful strategy.

Precisely, the petrochemical plant was planned to be built on land that belongs to the Republic of China (ROC) government, but since the project was deemed as "extremely important for Taiwan" by the Legislative Yuan, there was no reason for the government not to lease or sell the land to the developer. However, according to the *Non-Urban Land Use Regulations*, specifically subparagraph 9, if a developer does not have special permission (which the developer did not in this case) it cannot conduct any developmental activity within 3 km from a wetland. This meant that the KPT developer was breaking the ROC law in regards to coastal areas.[18] This violation was collected in a dossier containing all legal breaches by the project, which was then presented to the committee responsible for the approval of the plant.

Notwithstanding the numerous legal violations disclosed by activists and their lawyers, it was President Ma Ying-Jeou who settled the controversy in 2011, putting an end to the project, most likely out of electoral concerns for the upcoming presidential elections in 2012. In 2011, public support for KPT was at an all time low and the ruling Kuomintang (KMT) thought that this issue might damage the party's chances of re-election the following year.

Remaining barriers and environmental administration

This top-down decision generated a negative response among environmental activists, which brings me to the issue of identifying the remaining barriers to enforcement of an effective environmental protection system in Taiwan. Taiwan started building a system for environmental protection at the end of the 1980s. At this point, damages to the environment became so widespread that governmental officials were forced to take action and set up a formal monitoring system, which culminated in the creation of a quasi-ministerial body, the Environmental Protection

Administration (EPA). The EPA is the only agency charged with protecting the environment island-wide, employs little under 1000 people, and has a yearly budget (as of 2012) of NT$12.42 billion.[19] The agency, as the leading organ charged with protecting the island's fragile environment, has indeed enjoyed numerous successes and reached significant targets in the reduction of solid wastes, in spreading environmental awareness and in reducing air pollution; however, numerous problems remain. While Taiwan's environmental protection administrative framework is well developed and up to relevant international standards on paper, reaching a positive outcome in solving pollution and related problems often depends on a variety of other issues. In particular, the main hindrances are a lack of enforcement rather than absence of proper legislation.

For instance, in the petrochemical complex case, activists and their attorneys believed that the Environmental Impact Assessment Committee (環評大會 *huanping dahui*) was required to gauge the effects of the proposed plant on flora, fauna and residents of the area. Instead, on April 22, 2011 the committee put forward two available proposals: 1) stop the project; 2) go ahead with the project upon approval of certain conditions. Activists lament that procedurally this case should've been rejected by the committee, but instead, it was President Ma Ying-jeou's political statement that settled the case. As a result the developer withdrew the project. The the strategic timing of Ma's decision is also linked to the issue of land property in Taiwan. Owing to the mounting island-wide pressure towards illegal land-deals and requisitions (for instance, the in-famous case of Dapu, in Miaoli)[20], the central government felt more pressure to enforce land regulations.[21] Therefore, the upcoming national elections created several fruitful opportunities for environmentalists throughout 2010-11 (also due to the heightened awareness vis à vis environmental issues after the Fukushima nuclear meltdown in Japan). Political parties were forced to give in to mounting popular discontent against the KPT facility, and so, jumped on the environmental bandwagon to gain wider popular support. It is plausible that if the climax of the protest towards KPT had taken place in a less sensitive year, its fate might have turned out to be very different.

To this end, we can claim that environmental politics still take the back seat and activists' concerns are often subjected to bigger issues (e.g. economic development) and political interests. When public opinion becomes involved and cases become an issue of national interest, however, then the government takes notice. A similar thing happened more recently in 2014, when the government decided to suspend construction on the country's fourth nuclear power facility - already in its final stages, in the aftermath of the Sunflower Student Movement.[22] The international visibility attracted by the sunflower movement put the KMT administration under pressure, making it easier for protesters to exploit the situation and bring other issues to the fore, such as the anti-nuclear cause. Furthermore, these anti-nuclear protests took place in the months preceding the municipal elections of November 2014, where the KMT lost several key posts in many localities (e.g. the mayoralty of Taipei city) and after the Fukushima disaster, which generated a negative backlash among the public in regards to the safety of nuclear plants.

Whether a protest focuses on the abolition of nuclear energy or preventing the development of a petrochemical plant, the *fil rouge* that unites dissenters, is the upholding of Taiwan's democratic principles and the protection of its citizens' right to obtain transparent information and accountability from the government. In this regard, the significance of the recent civil activism and its importance for the environmental cause is enormous. In fact, the common denominator behind the protests is the perception that the government reaches several important decisions concerning Taiwan's wellbeing in closed-door meetings that do not involve public participation.Therefore, key factors affecting the positive or negative outcome in an environmental campaign depend on the nature and specific characteristics of the case as well as the strategic timing in which the protests take place.

Conclusions

Taiwan is often heralded as an example of a country that has enjoyed a smooth transition to democratization. However, democratization has created both opportunities and obstacles for groups whose interests lie with environmental protection.[23] In fact, although Taiwan needs civil and official collaboration on environmental protection, often the implementation of an efficient environmental regulation system is hindered by many agents and stakeholders, whose interests greatly diverge. Although environmental policies are, for the most part, mandated from the top, at the local level their implementation is altered by the interaction of these numerous agents.

After the year 2000, when the DPP ruled for the first time, many social activists became enlisted by the government and became part of the institutional establishment. This "institutionalization" made them quieter as they opted for official channels, rather than more radical modes of action such as street protests, to reach their goals. Since 2008, which is also the year in which the KMT returned to power after eight years as the opposition, social unrest has been rising again and the environmental movement has also enjoyed a phase of resurgence.

To conclude, I would argue that Taiwan's biggest problem for effectively tackling the country's environmental problems is what is perceived by many as a lack of transparency surrounding many policy-making or decision making processes. Despite the renewed vigor of protesters fighting polluting companies or plants, and the involvement of novel stakeholders, such as environmental lawyers and social groups, the persistence of old clientele networks, which tend to ease up restrictions for big businesses seeking to invest, can hamper the enforcement of the country's otherwise well developed system for environmental protection.

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[1] Williams, Jack, "Environmentalism in Taiwan," in *Taiwan: Beyond the Economic Miracle*, edited by Denis Fred Simon and Michael Y. M. Kau (M.E. Sharpe, 1992) pp. 187–210.

[2] Grano, Simona A., *Environmental Governance in Taiwan: a New Generation of Activists and Stakeholders*. (London and New York: Routledge, 2015) pp. 97-102.

[3] Williams, “Environmentalism in Taiwan,” p.193.

[4] Arrigo, Linda Gail and Gaia Pouleston, “The Environmental Movement in Taiwan after 2000: Advances and Dillemas” in *What Has Changed? Taiwan Before and After the Change in Ruling Parties*, edited by Dafydd Fell, Henning Kloter and Chang Bi-Yu (Wiesbaden: Harassowitz Verlag, 2006) p. 166.

[5] *Ibid*.

[6] Ho, Ming-sho. “A Conflict in Environmental Cultures: Tea-serving Volunteers and Conservationists in Taiwan”. Conference paper presented at Rikkyo University, June 30-July 1, 2012. Courtesy of the author.

[7] Ho, Ming-sho. *Green Democracy: A research on Taiwan’s environmental movements* [綠色民主：台灣環境運動的研究*Lüse Minzhu, Taiwan Huanjing yundong de yanjiu]*. (Taipei: Qunxue Publishing house, 2006) p. 52.

[8] Shih Fang-long, “Generating Power in Taiwan: Nuclear, Political and Religious Power.” *Culture and Religion* vol. 13, no. 3 (2012): 300.

[9] Ho, Ming-sho, “Weakened State and Social Movement: the paradox of Taiwanese environmental politics after power transfer,” *Journal of Contemporary China* vol.14, no 43 (May 2005): 342.

[10] Jhan, Jhang-cyan (詹長權), 從石化業的健康危害，看（六輕和國光石化去留）的抉擇 [Looking at the choice of building or not the sixth petrochemical plant and Kuokuang Petrochemical project from the health risks posed by the petrochemical industry]. 濕地，石化，島嶼的想像 [Wetland, petrochemical industry and island images]. pp. 48-54.

[11] Grano, *Environmental Governance in Taiwan,* p. 101.

[12] Ho, Ming-sho, “Resisting Naphtha Crackers: A Historical Survey of Environmental Politics in Taiwan”, *China Perspectives* vol. 3 (2014): 5-14.

[13] Naphtha normally refers to a number of different flammable liquid mixtures of hydrocarbons, i.e. a component of natural gas condensate or a distillation product from petroleum.

[14] Taiwan’s second biggest wetland, namely the wetland of Dacheng (大成溼地 *Dacheng shidi*).

[15] Currently fewer than 100 Taiwanese white dolphins remain; its population has plummeted in the past few years due to an increase in polluting factories nearby the coastal areas. The white dolphin, characterized by the pinkish hue of its skin, has become the symbol of the protest towards the petrochemical industry in central Taiwan and countless posters and blogs have been dedicated to it (see, for example “Save the Taiwanese White Dolphins,” http://taiwansousa.blogspot.com/).

[16] The founding of the Environmental Jurists Association (EJA) in 2010 has facilitated the gradual establishment of a category of legal experts involved in environmental struggles, whose engagement goes way further than that of a mere professional offering its services, acting as activists on behalf of ecological safeguarding.

[17] Several countries have set up special provisions for public participation in the planning phases of developmental projects or controversial facilities. The Environmental Impact Assesment in Taiwan, for instance, has American origins.

[18] Land-use regulations in Taiwan are purposely kept-vague so as to provide officials with enough maneuvering space when evaluating developmental projects, and keeping public involvement at the minimum. For more on this see Tang, Shui-Yan and Ching-Ping Tang, "Democratization and the Environment: Entrepreneurial Politics and Interest Representation in Taiwan," *The China Quarterly*. Vol. 158 (1999): 358; Author interview with Mr. Chan Shun-kuei, attorney at the Primordial Law Firm, November 18, 2011,Taipei.

[19] "Introduction to the Environmental Protection Administration," Environmental Protection Administration, Executive Yuan, April 2012, (http://www.epa.gov.tw /en/artshow.aspx?art=2007122413190511&path=9103&list=9044)

[20] The Dapu expropriation case involved four homeowners who became victims of land expropriation on July 18, 2013, as their houses were torn down by the local government to make way for a science park. The controversy was made worse by the fact that their houses were demolished while the owners were away pleading with the central government to stop the demolition. Police and governmental behavior triggered spontaneous protests by ordinary citizens across Taiwan. On January 3, 2014, a panel of three Taichung High Administrative Court judges found that the compulsory purchase of land belonging to Ms. Peng Hsiu-chun, Mr. Chang Sen-wen's widow (Chang Sen-wen was found dead under a bridge in what seemed to be a suicide in July 2013), and eight other citizens in four households, and the July 18 demolitions were "illegal" and voided the expropriation order, which had earlier been approved by the Ministry of the Interior (MOI).

[21] Hua, Chang-I, "Land Problems, Planning Failure, and the Pending National Land Planning Law" in *Planning in Taiwan: Spatial Planning in the Twenty-first Century*, edited by Roger Bristow (London and New York: Routledge, 2010) pp. 51-73.

[22] The Sunflower Student Movement (*taiyanghua xueyun* 太陽花學運) was a 24-day occupation (March 18 – April 10, 2014) of Taiwan's legislature, to protest the Cross-Strait Service Trade Agreement (CSSTA) for which protesters maintained a "clause by clause" review was needed. The treaty, signed between China and Taiwan in June 2013, was one of the follow-up agreements to a controversial Economic Cooperation Framework Agreement (ECFA) signed in 2010.

[23] Tang and Tang, "Democratization and the Environment," 351.

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